

Amendments to the claims

1. (Currently Amended) Apparatus comprising:

an electrode device, configured adapted to be coupled to a site of a subject selected from the group consisting of: a vagus nerve of a subject, and an epicardial fat pad; and

a control unit, configured adapted to:

drive the electrode device to apply ~~to the vagus nerve~~ a current to the site, and ~~that~~

configure the current to reduce[[s]] heart rate variability of the subject below a baseline heart rate variability of the subject when the current is not applied,

~~wherein the control unit is adapted to drive the electrode device to apply the current with an amplitude of between about 2 and about 10 milliamps.~~

2. (Currently Amended) The apparatus according to claim 1, wherein the control unit is configured adapted to configure the current to substantially not reduce a heart rate of the subject.

3. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject, and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 121, wherein the control unit is configured adapted to configure the current to reduce the heart rate variability by at least 5% below the [[a]] baseline heart rate variability thereof during a time period in which a heart rate of the subject is not reduced responsive to the current by more than 10% below a baseline thereof.

4. (Canceled)

5. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device during exertion by the subject.

6. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to withhold driving the electrode device when the subject is not experiencing exertion.

7. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to configure the current to reduce a heart rate variability of the subject having a characteristic frequency between about 0.15 and about 0.4 Hz.

8. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to configure the current to reduce a heart rate variability of the subject having a characteristic frequency between about 0.04 and about 0.15 Hz.

9. (Canceled)

10. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device to apply the current in intermittent ones of a plurality of cardiac cycles of the subject.

11. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device to apply the current unsynchronized with a cardiac cycle of the subject.

12. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device responsive to a circadian rhythm of the subject.

13. (Currently Amended) The apparatus according to claim 12, wherein the control unit is configured ~~adapted~~ to drive the electrode device when the subject is awake.

14. (Currently Amended) The apparatus according to claim 12, wherein the control unit is configured ~~adapted~~ to withhold driving the electrode device when the subject is sleeping.

15. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device to apply the current in a manner that reduces to configure the current to reduce the heart rate variability by at least 10%.

16. (Currently Amended) The apparatus according to claim 15, wherein the control unit is configured ~~adapted~~ to drive the electrode device to apply the current in a manner that reduces to configure the current to reduce the heart rate variability by at least 50%.

17. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device to apply the current in a manner that reduces to configure the current to reduce a standard deviation of a heart rate of the subject within a time window.

18. (Currently Amended) The apparatus according to claim 17, wherein the control unit is configured ~~adapted to drive the electrode device to apply the current in a manner that reduces to~~ configure the current to reduce a standard deviation of the heart rate of the subject within a time window longer than 10 seconds.

19. (Currently Amended) The apparatus according to claim 18, wherein the control unit is configured ~~adapted to drive the electrode device to apply the current in a manner that reduces to~~ configure the current to reduce by at least about 10% the standard deviation of the heart rate within the time window longer than 10 seconds.

20. (Currently Amended) The apparatus according to claim 19, wherein the control unit is configured ~~adapted to drive the electrode device to apply the current in a manner that reduces to~~ configure the current to reduce by at least about 50% the standard deviation of the heart rate within the time window longer than 10 seconds.

21. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to drive the electrode device to apply the current in respective pulse bursts in each of a plurality of cardiac cycles of the subject.

22. (Currently Amended) The apparatus according to claim 21, wherein the control unit is configured ~~adapted~~ to configure each pulse of each of the bursts to have a pulse duration of between about 0.1 and about 4 milliseconds.

23. (Currently Amended) The apparatus according to claim 22, wherein the control unit is configured ~~adapted~~ to configure each

pulse of each of the bursts to have a pulse duration of between about 0.5 and about 2 milliseconds.

24. (Currently Amended) The apparatus according to claim 21, wherein the control unit is configured ~~adapted~~ to configure each of the bursts to have a pulse repetition interval of between about 2 and about 10 milliseconds.

25. (Currently Amended) The apparatus according to claim 24, wherein the control unit is configured ~~adapted~~ to configure each of the bursts to have a pulse repetition interval of between about 2 and about 6 milliseconds.

26. (Currently Amended) The apparatus according to claim 21, further comprising a cardiac monitor, configured ~~adapted~~ to generate a cardiac signal, wherein the control unit is configured ~~adapted~~ to receive the cardiac signal, and to initiate the applying of each burst after a delay following detection of a feature of the cardiac signal.

27. (Currently Amended) The apparatus according to claim 26, wherein the control unit is configured ~~adapted~~ to initiate the applying of each burst after a delay of about 30 to about 200 milliseconds following an R-wave of the cardiac signal.

28. (Currently Amended) The apparatus according to claim 27, wherein the control unit is configured ~~adapted~~ to initiate the applying of each burst after a delay of about 50 to about 150 milliseconds following an R-wave of the cardiac signal.

29. (Currently Amended) The apparatus according to claim 21, wherein the control unit is configured ~~adapted~~ to configure at least one of the bursts to have between about 0 and about 20 pulses.

30. (Currently Amended) The apparatus according to claim 29, wherein the control unit is configured ~~adapted~~ to configure the bursts to have between about 1 and about 8 pulses during steady state operation.

31. (Currently Amended) The apparatus according to claim 1, further comprising a heart sensor, configured to detect heart activity of the subject, and to generate a heart signal responsive thereto, wherein the control unit is configured ~~adapted~~ to:

 receive the heart signal, and
 responsive to receiving the heart signal, drive the electrode device to apply the current to the site ~~vagus nerve~~.

32. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject;~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject;~~

~~a heart sensor, configured to detect heart activity of the subject, and to generate a heart signal responsive thereto, wherein the control unit is adapted to:~~

~~receive the heart signal, and
 responsive to receiving the heart signal, drive the electrode device to apply the current to the vagus nerve,~~

The apparatus according to claim 31, wherein the control unit is configured ~~adapted~~ to, responsive to receiving the heart signal, drive the electrode device to apply to the site ~~vagus nerve~~ the current synchronized with a cardiac cycle of the subject.

33. (Currently Amended) The apparatus according to claim 31, wherein the control unit is configured ~~adapted~~ to, responsive to receiving the heart signal, drive the electrode device to apply to the site ~~vagus nerve~~ the current unsynchronized with a cardiac cycle of the subject.

34. (Currently Amended) The apparatus according to claim 1, wherein the control unit is configured ~~adapted~~ to configure the current to reduce a heart rate of the subject.

35. (Currently Amended) The apparatus according to claim 34,
comprising a sensor, configured to detect the heart rate of
the subject, and to generate a heart rate signal responsive
thereto,

~~wherein the control unit comprises an integral feedback
controller that has inputs comprising the detected heart rate and
a target heart rate,~~

and wherein the control unit is configured adapted to
configure the current ~~responsive to an output of the integral
feedback controller,~~ so as to reduce the heart rate of the
subject toward ~~[[the]]~~ a target heart rate, responsively to the
heart rate signal.

36. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve
of a subject; and~~

~~a control unit, adapted to drive the electrode device to
apply to the vagus nerve a current that reduces heart rate
variability of the subject,~~

~~wherein the control unit is adapted to configure the current
to reduce a heart rate of the subject, and~~

~~comprising a sensor, configured to detect the heart rate of
the subject, and to generate a heart rate signal responsive
thereto,~~

~~wherein the control unit comprises an integral feedback
controller that has inputs comprising the detected heart rate and
a target heart rate,~~

~~wherein the control unit is adapted to configure the current
responsive to an output of the integral feedback controller, so
as to reduce the heart rate of the subject toward the target
heart rate, and~~

The apparatus according to claim 35, wherein the target
heart rate includes a target normal heart rate within a range of
normal heart rates of the subject, and wherein the control unit

is configured ~~adapted~~ to configure the current to reduce the heart rate of the subject toward the target normal heart rate.

37. (Canceled)

38. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

~~wherein the control unit is adapted to configure the current to reduce the heart rate variability to treat a condition of the subject,~~

The apparatus according to claim 120, wherein the condition includes heart failure of the subject, and

wherein the control unit is configured ~~adapted~~ to configure the current to reduce the heart rate variability by at least about 10% so as to treat the heart failure.

39. (Currently Amended) ~~Apparatus comprising:~~

~~an electrode device, adapted to be coupled to a vagus nerve of a subject; and~~

~~a control unit, adapted to drive the electrode device to apply to the vagus nerve a current that reduces heart rate variability of the subject,~~

~~wherein the control unit is adapted to configure the current to reduce the heart rate variability to treat a condition of the subject,~~

The apparatus according to claim 120, wherein the condition includes an occurrence of arrhythmia of the subject, and

wherein the control unit is configured ~~adapted~~ to configure the current to reduce the heart rate variability by at least about 10% so as to treat the occurrence of arrhythmia.

40. (Previously Presented) The apparatus according to claim 39, wherein the condition includes atrial fibrillation of the

subject, and wherein the control unit is configured ~~adapted~~ to configure the current to reduce the heart rate variability so as to treat the atrial fibrillation.

41. (Currently Amended) A method comprising:

~~applying to a vagus nerve of a subject~~ a current to a site of a subject selected from the group consisting of: a vagus nerve, and an epicardial fat pad; and

configuring the current to reduce that reduces heart rate variability of the subject below a baseline heart variability of the subject when the current is not applied,

~~wherein applying the current comprises applying the current with an amplitude of between about 2 and about 10 milliamps.~~

42. (Original) The method according to claim 41, wherein applying the current comprises configuring the current to substantially not reduce a heart rate of the subject.

43. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 126, wherein configuring ~~applying~~ the current comprises configuring the current to reduce the heart rate variability by at least 5% below the ~~the~~ baseline heart rate variability thereof during a time period in which a heart rate of the subject is not reduced responsive to the current by more than 10% below a baseline thereof.

44. (Canceled)

45. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises detecting exertion by the subject and applying the current during the exertion.

46. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises:

detecting whether the subject is experiencing exertion; and
withholding applying the current when the subject is not experiencing exertion.

47. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises configuring the current to reduce a heart rate variability of the subject having a characteristic frequency between about 0.15 and about 0.4 Hz.

48. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises configuring the current to reduce a heart rate variability of the subject having a characteristic frequency between about 0.04 and about 0.15 Hz.

49. (Canceled)

50. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises applying the current in intermittent ones of a plurality of cardiac cycles of the subject.

51. (Original) The method according to claim 41, wherein applying the current comprises applying the current unsynchronized with a cardiac cycle of the subject.

52. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises applying the current responsive to a circadian rhythm of the subject.

53. (Original) The method according to claim 52, wherein applying the current comprises applying the current when the subject is awake.

54. (Original) The method according to claim 52, wherein applying the current comprises withholding applying the current when the subject is sleeping.

55. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises applying configuring the current ~~in a manner that reduces~~ to reduce the heart rate variability by at least 10%.

56. (Currently Amended) The method according to claim 55, wherein applying the current comprises applying configuring the current ~~in a manner that reduces~~ to reduce the heart rate variability by at least 50%.

57. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises applying configuring the current ~~in a manner that reduces~~ to reduce a standard deviation of a heart rate of the subject within a time window.

58. (currently amended) The method according to claim 57, wherein applying the current comprises applying configuring the current ~~in a manner that reduces~~ to reduce a standard deviation of the

heart rate of the subject within a time window longer than 10 seconds.

59. (Currently Amended) The method according to claim 58, wherein applying the current comprises ~~applying~~ configuring the current ~~in a manner that reduces~~ to reduce by at least about 10% the standard deviation of the heart rate within the time window longer than 10 seconds.

60. (Currently Amended) The method according to claim 59, wherein applying the current comprises ~~applying~~ configuring the current ~~in a manner that reduces~~ to reduce by at least about 50% the standard deviation of the heart rate within the time window longer than 10 seconds.

61. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

The method according to claim 41, wherein applying the current comprises applying the current in respective pulse bursts in each of a plurality of cardiac cycles of the subject.

62. (Original) The method according to claim 61, wherein applying the current comprises configuring each pulse of each of the bursts to have a pulse duration of between about 0.1 and about 4 milliseconds.

63. (Original) The method according to claim 62, wherein applying the current comprises configuring each pulse of each of the bursts to have a pulse duration of between about 0.5 and about 2 milliseconds.

64. (Original) The method according to claim 61, wherein applying the current comprises configuring each of the bursts to have a pulse repetition interval of between about 2 and about 10 milliseconds.

65. (Original) The method according to claim 64, wherein applying the current comprises configuring each of the bursts to have a

pulse repetition interval of between about 2 and about 6 milliseconds.

66. (Currently Amended) The method according to claim 61, ~~comprising receiving a cardiac signal,~~ wherein applying the current comprises receiving a cardiac signal, and initiating the applying of each burst after a delay following detection of a feature of the cardiac signal.

67. (Original) The method according to claim 66, wherein applying the current comprises initiating the applying of each burst after a delay of about 30 to about 200 milliseconds following an R-wave of the cardiac signal.

68. (Original) The method according to claim 66, wherein applying the current comprises initiating the applying of each burst after a delay of about 50 to about 150 milliseconds following an R-wave of the cardiac signal.

69. (Original) The method according to claim 61, wherein applying the current comprises configuring at least one of the bursts to have between about 0 and about 20 pulses.

70. (Original) The method according to claim 69, wherein applying the current comprises configuring the bursts to have between about 1 and about 8 pulses during steady state operation.

71. (Currently Amended) The method according to claim 41, ~~comprising detecting heart activity of the subject, and generating a heart signal responsive thereto,~~ wherein applying the current comprises:

detecting heart activity of the subject, and generating a heart signal responsive thereto;

receiving the heart signal; and

responsive to receiving the heart signal, applying the current to the site ~~vagus nerve~~.

72. (Currently Amended) ~~A method comprising:~~

~~applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject; and~~

~~detecting heart activity of the subject, and generating a heart signal responsive thereto,~~

The method according to claim 71, wherein applying the current comprises:

~~receiving the heart signal;~~

comprises, responsive to receiving the heart signal, synchronizing the current with a cardiac cycle of the subject, and applying the synchronized current to the site ~~vagus nerve~~.

73. (Currently Amended) ~~A method comprising:~~

~~applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject;~~

~~detecting heart activity of the subject, and generating a heart signal responsive thereto,~~

The method according to claim 71, wherein applying the current comprises[[:]]

~~receiving the heart signal; and~~

applying the current to the site ~~vagus nerve~~, (a) responsive to receiving the heart signal, and (b) unsynchronized with a cardiac cycle of the subject.

74. (Original) The method according to claim 41, wherein applying the current comprises configuring the current to reduce a heart rate of the subject.

75. (Currently Amended) The method according to claim 74, ~~comprising detecting the heart rate of the subject,~~ wherein applying the current comprises detecting the heart rate of the subject, and configuring the current ~~so as~~ to reduce the heart rate of the subject toward a target heart rate, responsively to the heart rate signal, ~~responsive to an output of an integral feedback controller whose inputs comprise the detected heart rate and the target heart rate.~~

76-77. (Canceled)

78. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

~~wherein applying the current comprises configuring the current to reduce the heart rate variability so as to treat a condition of the subject,~~

The method according to claim 127, wherein the condition includes heart failure of the subject, and

~~wherein applying the current~~ treating the condition comprises configuring the current to reduce the heart rate variability by at least about 10% so as to treat the heart failure.

79. (Currently Amended) ~~A method comprising applying to a vagus nerve of a subject a current that reduces heart rate variability of the subject,~~

~~wherein applying the current comprises configuring the current to reduce the heart rate variability so as to treat a condition of the subject,~~

The method according to claim 127, wherein the condition includes an occurrence of arrhythmia of the subject, and

~~wherein applying the current~~ treating the condition comprises configuring the current to reduce the heart rate variability by at least about 10% so as to treat the occurrence of arrhythmia.

80. (Currently Amended) The method according to claim 79, wherein the condition includes atrial fibrillation of the subject, and wherein ~~applying the current~~ treating the condition comprises configuring the current to reduce the heart rate variability so as to treat the atrial fibrillation.

81-118. (Canceled)

119. (New) The apparatus according to claim 1, wherein the control unit is configured to drive the electrode device to apply

the current with an amplitude of between about 2 and about 10 milliamps.

120. (New) The apparatus according to claim 1, wherein the control unit is configured to configure the current to treat a condition of the subject by reducing the heart rate variability.

121. (New) The apparatus according to claim 1, wherein the control unit is configured to configure the current to reduce the heart rate variability by at least 5% below the baseline heart rate variability.

122. (New) The apparatus according to claim 1, wherein the control unit is configured to configure the current to cause a prolonged reduced level of the heart rate variability.

123. (New) The apparatus according to claim 35, wherein the control unit comprises an integral feedback controller that has inputs comprising the detected heart rate and the target heart rate, and wherein the control unit is configured to configure the current responsively to an output of the integral feedback controller.

124. (New) The apparatus according to claim 35, wherein the target heart rate is lower than a normal average heart rate of the subject, and wherein the control unit is configured to configure the current to reduce the heart rate of the subject toward the target heart rate.

125. (New) The method according to claim 41, wherein applying the current comprises applying the current with an amplitude of between about 2 and about 10 milliamps.

126. (New) The method according to claim 1, wherein applying the current comprises configuring the current to reduce the heart rate variability by at least 5% below the baseline heart rate variability.

127. (New) The method according to claim 41, wherein applying and configuring the current comprise:

identifying that the subject suffers from a condition; and
responsively to the identifying, treating the condition by
reducing the heart rate variability by applying and configuring
the current.

128. (New) The method according to claim 41, wherein configuring
the current comprises configuring the current to cause a
prolonged reduced level of the heart rate variability.

129. (New) The method according to claim 75, wherein configuring
the current comprises configuring the current to reduce the heart
rate toward the target heart rate responsively to an output of an
integral feedback controller whose inputs comprise the detected
heart rate and the target heart rate.

130. (New) The method according to claim 75, wherein the target
heart rate is lower than a normal average heart rate of the
subject, and wherein applying the current comprises configuring
the current to reduce the heart rate of the subject toward the
target heart rate.

131. (New) The method according to claim 75, wherein the target
heart rate includes a target normal heart rate within a range of
normal heart rates of the subject, and wherein applying the
current comprises configuring the current to reduce the heart
rate of the subject toward the target normal heart rate.